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NATIONAL DAM INSPECTION PROGRAM. LAKE ASHBURTON (NDI ID MD-108)--ETC(U)
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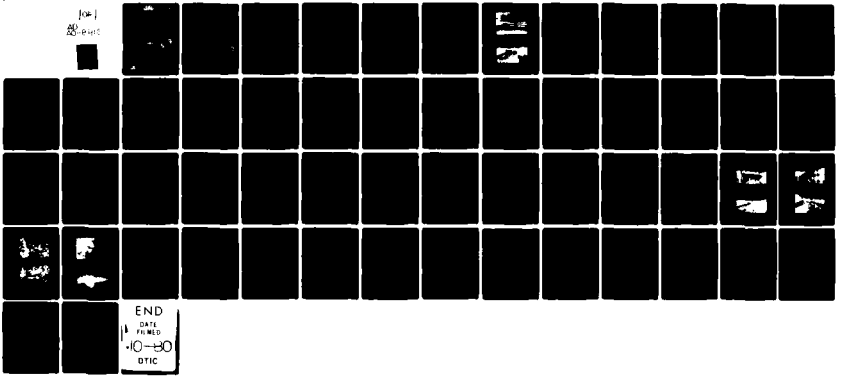

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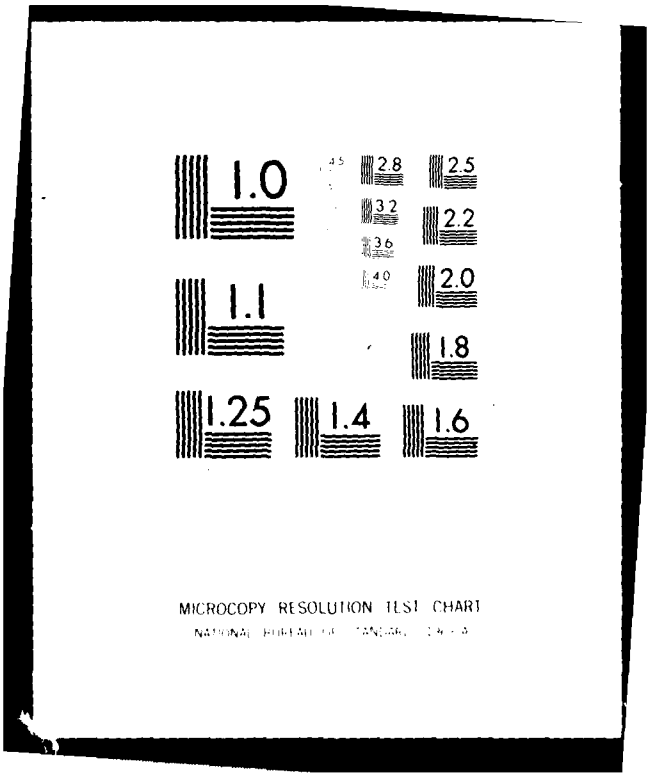
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LEVEL II

PATAPSCO RIVER BASIN
GWYNNS RUN, BALTIMORE CITY

AD A088815

MARYLAND

LAKE ASHBURTON

NDI ID NO. MD-108

CITY OF BALTIMORE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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DACW31-80-C-0050

Prepared For
DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

By
RUMMEL, KLEPPER & KAHL
Consulting Engineers
Baltimore, Maryland 21202

JUNE 1980

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PATAPSCO RIVER BASIN,

GWYNNS RUN, BALTIMORE CITY,

MARYLAND.

National Dam Inspection Program

LAKE ASHBURTON

(NDI ID [redacted] MD-108)

[redacted]

~~DEPARTMENT OF PUBLIC WORKS~~

PHASE I INSPECTION REPORT,

NATIONAL DAM INSPECTION PROGRAM

DACW31-80-C-0050

Prepared for:
DEPARTMENT OF THE ARMY
Baltimore District Corps of Engineers
Baltimore, Maryland 21203

By:
RUMMEL, KLEPPER & KAHL
Consulting Engineers
1035 N. Calvert Street
Baltimore, Maryland 21202

June 1980

41015

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon visual observations and review of available data. Detailed investigations and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the inspection is intended to identify any need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The assessment of the conditions and recommendations was made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

PATAPSCO RIVER BASIN

GWYNNS RUN, BALTIMORE CITY
MARYLAND

LAKE ASHBURTON
NDI ID NO. MD-108

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS

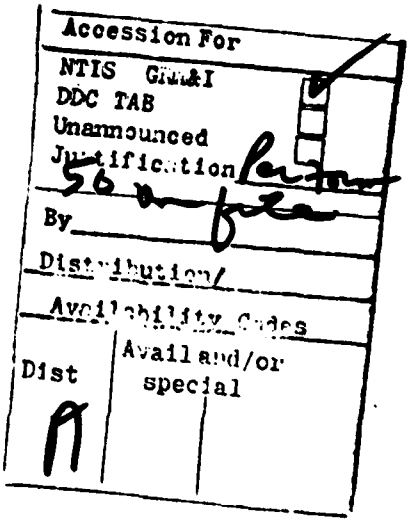
PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

June, 1980

CONTENTS

APPENDICES



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION AND RECOMMENDED ACTION

Name of Dam:	Lake Ashburton NDI ID No. MD-108
Size:	Intermediate (750 acre-feet, 40 feet high)
Hazard Classification:	High
Owner:	City of Baltimore Department of Public Works 600 Municipal Office Building Baltimore, Maryland 21202
State Located:	Maryland
City Located:	Baltimore
Stream:	Gwynns Run
Date of Inspection:	May 26, 1980

Based on the visual inspection, available records, past operational performance, and in accordance with the guideline criteria established for these studies, Lake Ashburton is judged to be in good condition.

The water level in Lake Ashburton is maintained at approximately elevation 352 by controlling the inflow of water from the Ashburton Water Purification Plant and the outflow of water through the gate house located along the southeast embankment of the impoundment. The outflow is either directed by gravity to the Baltimore City Second Service Zone or is pumped by the Ashburton Pumping Station to the Western Third Water Service Zone.

The reservoir impounds finished water for Baltimore City's water distribution system and was therefore constructed in a manner to prevent surface water runoff from the upstream drainage area from reaching the lake. Except for rainfall on the reservoir surface, all inflow into the lake is controlled, and therefore flood routing analyses are not required.

No stability problems were evident for the embankment or the appurtenant structures at the time of the visual inspection.

A small seepage of water was noted near the western end of the toe of the Washwater Lake located east of Lake Ashburton. It is not apparent whether the seepage is originating from the Wash Water Lake (Peck's Branch Dam), Lake Ashburton, or from another source. The seepage was noted by Baltimore City employees at the Ashburton Water Purification Plant as early as 1977. The seepage does not appear to be carrying any fines with it. Even if the seepage is from Lake Ashburton, it is not considered to be significant enough at this point to jeopardize the structural integrity of the Lake Ashburton embankment.

The following remedial measures are recommended to be accomplished by the Owner:

1. Repair the erosion gully halfway up the downstream side of the eastern embankment.

2. Fill the animal burrows noted on the eastern embankment.

3. Regularly check the operation of the sluice gate and all gate valves which are involved in maintaining the water level in the lake.

4. The small seepage area observed near the toe of the embankment at the western end of Wash Water Lake should be inspected on a regular basis. The source of the seepage is not apparent, but it could possibly be from Lake Ashburton, from the Wash Water Lake, or from the 48-inch water line in the vicinity. If the seepage rate increases significantly, or if there is a change in the turbidity of the seepage, an investigation should be conducted to positively identify the source, and if warranted, the seepage should be controlled.

5. Control the brush and shrub growth on the embankment slopes.

6. Develop a formal warning system to alert downstream residents in the event of emergencies.

Submitted by:

RUMMEL, KLEPPER & KAHL

Edward J. Zeigler, P.E.
Associate

Date: July 5, 1984

Approved by:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 31 July 1984

Downstream Slope

Embankment Crest

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE ASHBURTON
NDI ID NO. MD-108

SECTION I
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to inititiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the dam inspection program is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Lake Ashburton, constructed in 1910, is a zoned earth and rockfill embankment with a puddled trench core. The embankment is approximately 40 feet high at its maximum section and is approximately 1700 feet long. No internal filter or drainage systems are known to exist.

Finished water from the Ashburton Water Purification Plant is the normal source of supply for Lake Ashburton and is fed into the lake through an 84-inch transmission main by gravity. Inflow to the impoundment can be controlled by a 60-inch gate valve on the 84-inch main or by an 84-inch sluice gate at the plant. Outflows from the reservoir are pumped to the Western Third Water Service Zone by the Ashburton Pumping Station and are back-fed to the water distribution system serving Baltimore City's Second Water Service Zone.

Because essentially all significant inflow to the reservoir is controlled by personnel at the Ashburton Water Purification Plant, detailed hydraulic and hydrologic analyses have not been performed.

The various features of the dam and impoundment are shown on the photographs in Appendix C and on the Plates in Appendix E. A description of the geology is included in Appendix F.

b. Location. Lake Ashburton is located adjacent to the Gwynns Run in Baltimore, Maryland. Lake Ashburton is shown on U.S.G.S. Quadrangle, Baltimore West, Maryland, at latitude N39°19'00" and longitude W76°40'00". A location map is included as Plate E-1.

c. Size Classification. Intermediate (40 feet high, 750 acre-feet).

d. Hazard Classification. High hazard. Downstream conditions indicate that a high hazard classification is warranted for Lake Ashburton.

e. Ownership. City of Baltimore, Department of Public Works, 600 Municipal Building, Baltimore, Maryland 21202.

f. Purpose of Dam. Finished water storage for the Baltimore City Water Distribution System.

g. Design and Construction History. Construction of Lake Ashburton was completed in 1910. According to the typical section of the embankment shown on a construction drawing obtained from the City of Baltimore, the upstream and downstream slopes are comprised of an earth and rock fill. The core of the embankment is comprised of puddled select material and a puddled clay cut-off wall.

h. Normal Operating Procedure. The pool level in Lake Ashburton is normally maintained at elevation 352 by controls in the Ashburton Water Purification Plant. The water level is monitored by a pressure sensor on the Ashburton Pumping Station suction main . Water enters the reservoir by gravity through an 84-inch transmission main from the Ashburton Water Purification Plant. Water flows out of the reservoir through a gate house to either the Ashburton Pumping Station for distribution to the Western Third Water Service Zone or by gravity to another distribution system serving the Baltimore City Second Water Service Zone.

The reservoir could be drained in approximately four days if necessary by closing an 84-inch sluice gate at the purification plant, closing a gate valve on the 48-inch main feeding the Baltimore City Second Service Zone, and pumping the water out through the pumping station as long as the Western Third Service Zone could accommodate the demand.

1.3 Pertinent Data.

a. Drainage Area. Not Applicable.

b. Discharge at Dam Site. Not Applicable.

c. Elevation (Baltimore City Datum - Feet).

Top of Dam	355.9 (low point on crest)
Maximum Pool	353 (overflow-Gate House)
Normal Pool	352
Upstream Invert outlet works	N/A
Downstream Invert outlet works	N/A
Streambed at centerline of dam	N/A
Maximum Tailwater	N/A
Downstream Toe	316±

d. Reservoir Length:

Normal Pool level	1600'+
Maximum Pool level	1600'+

e. Storage (acre-feet)

Normal Pool level	650
Maximum Pool level	675
Top of Dam	750

f. Reservoir Surface (acres)

Normal Pool	25
Maximum Pool	26
Top of Dam	27

g. Dam.

Type:	Earth and rock fill
Length:	1700'±
Height:	40'± maximum (Field measurement)
Top Width:	25' to 35' (Field measurement)
Side Slopes	Downstream: 1V: 2.5H
	Upstream: 1V: 4H
Zoning:	Yes
Impervious Core:	Yes
Cutoff:	Yes
Grout Curtain:	None

g. Regulating Outlet.

Type:	Pressure Conduit
Length:	Not Applicable
Closure:	Gate Valves
Access:	Valve Vaults
Regulating Facilities:	Not Applicable

i. Spillway. Not Applicable

SECTION 2
DESIGN DATA

2.1 Design.

a. Data Available. Old construction drawings obtained from Baltimore City illustrate a typical section of the embankment.

(1) Hydrology and Hydraulics. No hydrology and hydraulic analyses are available. The records include a storage capacity vs. elevation curve for the reservoir, and piping diagrams for the present operation of the reservoir.

(2) Embankment. A typical section of the dam embankment is available.

(3) Appurtenant Structures. Design drawings are available of the system piping and inlet and outlet facilities.

b. Design Features.

(1) Embankment. Examination of photogrammetry and visual inspection of surrounding topography indicates that an earth embankment approximately 1700± feet long and, at its highest point, 40' high was constructed. According to a plan of the construction site obtained from the City of Baltimore, the embankment was constructed across a valley drained by Williams Run which joined Gwynns Run just east of the embankment. No evidence of the abandoned Williams Run channel was identified in the field.

(2) Appurtenant Structures. The appurtenant structure for the dam consists of the Gate House located in the dam embankment on the southeast shoreline of the reservoir.

c. Design Data.

(1) Hydrology and Hydraulics. No design data is available. A tabulation derived from a storage curve vs. elevation curve for Lake Ashburton is included in Appendix D.

(2) Embankment. A construction drawing showing a typical section of the dam embankment available and included in Appendix E.

2.2 Construction. Other than the drawing which was obtained from the City of Baltimore illustrating the typical section of the embankment, no data is available on the construction of the dam.

2.3 Operation. The only formal records maintained by the City of Baltimore are records of the mechanical and electrical equipment.

2.4 Other Investigations. None reported.

2.5 Evaluation.

a. Availability. Other than a construction drawing illustrating a typical section of the dam embankment, no design information is available.

b. Adequacy. The available information included no data which would allow the technical assessment of the embankment. Therefore, the available data is not considered sufficient to evaluate the design and construction of the dam.

SECTION 3
VISUAL INSPECTION

3.1 Findings.

a. General. The on-site inspection of Lake Ashburton consisted of:

(1) Visual inspection of the embankment, abutments, and embankment toe.

(2) Visual examination of the appurtenant structures.

(3) Evaluation of the downstream area hazard potential.

The specific observations are shown on Plate A-1.

b. Embankment. The general inspection of the embankment consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing general maintenance conditions, vegetative cover, erosion, and other surficial features.

No evidence of any structural distress was observed during the visual inspection. One erosion gully, approximately 2' wide, 1' deep and 10' long was noted halfway up the eastern embankment. The peripheral sidewalk on the crest showed no signs of settlement or distress. Two animal burrows were noted near the toe of the downstream slope.

A small seepage area was noted near the toe of the western end of the embankment of the Wash Water Lake located east of Lake Ashburton. The source of the leak cannot be positively identified, i.e. whether it is from the Wash Water Lake, from Lake Ashburton, or from the 48-inch water line approximately 90 feet upslope from the seepage area. Personnel at the Ashburton Water Purification Plant have been aware of the seepage since 1977. At the time of the inspection, the seepage water was carrying no fines and was flowing at a rate of approximately 1 to 2 gallons per minute.

The crest of the dam was surveyed and was found to vary in elevation by approximately 12 inches. Freeboard at the time of inspection was approximately 4 feet and under maximum pool conditions would be approximately 3 feet. The dam crest profile is included as Plate E-4.

c. Appurtenant Structures. The appurtenant structures were found to be in good condition. It is presumed that the gates in the Ashburton Gate House no longer serve any useful purpose and it is not known whether they are still operable.

d. Reservoir Area. Stone riprap lines the upstream slopes of the embankment at pool level to retard erosion of the embankment. No riprap failures were noted. With the exception of rain falling directly on the Lake, all runoff from the upstream drainage area is intercepted and directed away from the lake. Little sedimentation was noted on the lake bottom.

e. Downstream Channel. No distinct downstream channel exists, but water from an embankment failure would flow directly into Gwynns Run which flows through Hanlon recreational park along Dukeland Street. From the southern end of the Wash Water Lake east of Lake Ashburton, Gwynns Run flows 2000± feet until it reaches Gwynns Falls Parkway, where flow is directed into a large conduit. The capacity of the culvert is conservatively estimated at 2000 cfs. The culvert could not carry the complete flow of a dam failure that would empty the reservoir in approximately 1/2 hour. Therefore, the residences downstream of Gwynns Falls Parkway would be endangered, and a high hazard classification is warrented for Lake Ashburton.

3.2 Evaluation. The visual examination and observations of Lake Ashburton indicate that the embankment and appurtenant structures are in good condition, even though the source of the seepage noted near the toe of the embankment of the Wash Water Lake cannot be positively identified. We do recommend that the seepage be observed on a regular basis, and if it increases significantly, an investigation should be conducted to positively identify its source, and if necessary, to control the seepage.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. There is a regular exchange of water into and out of the reservoir each day. For the month of April 1980, Ashburton Purification Plant officials reported the system demands at 52 million gallons per day. The reported capacity of the lake is 220 million gallons. The reservoir level is normally maintained at elevations between 352 and 353 by the interplay of inflow from the Ashburton Water Purification Plant and outflow through the gate house to either the Ashburton Pumping Station serving the Western Third Water Service Zone or by gravity to the Baltimore City Second Water Service Zone.

4.2 Maintenance of the Dam. The maintenance of the dam is considered good. The crest of the dam carries a perimeter concrete walk which is maintained by the City of Baltimore.

The downstream slope of the embankment is covered by grass and low brush is generally well maintained.

4.3 Maintenance of Operating Facilities. The operating facilities are maintained satisfactorily in order to accommodate the daily demands of Baltimore City's water distribution system. No major problems with the facilities have been reported or documented.

4.4 Warning System No formal warning system exists for the dam. Reservoir water levels are recorded at the Ashburton Pumping Station and recorded and continuously monitored at the central telemetering control center at the Ashburton Water Purification Plant. In the event of an emergency, inflow into the reservoir could be shut off, and using two of the pumps at the Ashburton Pumping Station, the reservoir could be dewatered in four days.

4.5 Evaluation. The maintenance of the dam and the operating facilities is considered good.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features.

a. Design Data. Original design data for the hydraulics and hydrology of Lake Ashburton are not available. Photocopies of "Storage Capacity vs. Elevation" curves for Lake Ashburton have been obtained from the City of Baltimore. A tabulation of reservoir storage versus pool elevation is included as Page D-2 of Appendix D.

Because all inflow with the exception of rainfall on the lake is controlled, hydraulic and hydrologic analyses have not been performed for Lake Ashburton. The hazard classification for this small impoundment is considered high.

b. Experience Data. The reservoir water levels are monitored utilizing a pressure sensor on the Ashburton Pumping Station suction main and are automatically recorded continuously. Recorded water levels are correlated approximately every 2 months with water level readings taken from the reservoir staff gage.

There is no information that would indicate that there has ever been a problem with Lake Ashburton storing or passing rainfall from severe storms including hurricanes.

c. Visual Observations. Visual examination of the embankment, appurtenant structures, and downstream floodplain indicate that there are no problems with the hydraulic and hydrologic aspects of Lake Ashburton.

d. Overtopping Potential. There is no evidence that potential overtopping is a problem. Inflow to the lake can be shut off by manually closing an 84-inch sluice gate at the Ashburton Water Purification Plant. Then, if lowering the reservoir level is necessary, water can be directed to either of the two water distribution systems associated with the Lake. No evidence exists that Lake Ashburton ever overtopped or has been in danger of overtopping.

e. Spillway Adequacy. There is no spillway for Lake Ashburton but the existing effluent conduits and outflow at Lake Ashburton are considered adequate for the manner in which the reservoir is operated.

f. Downstream Channel. In the event of dam failure, the culvert under Gwynns Falls Parkway could not carry the flow of Gwynns run thereby endangering the residences downstream. A high hazard classification is therefore warrented for Lake Ashburton.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations.

(1) Embankment. As indicated in Section 3, there are no major deficiencies which may adversely affect the stability of the dam at this time.

(2) Appurtenant Structures. The structural condition of the appurtenant structures is considered to be satisfactory.

b. Design and Construction Data.

(1) Embankment. What little data exists does not include any quantitative data to aid in the assessment of the structural stability of the dam. The construction drawings do indicate that the dam embankment contains a puddled trench and a puddled clay cut-off wall. No conditions were observed that would significantly affect the stability of the dam.

(2) Appurtenant Structures. Available information does not include adequate data to assess the structural adequacy of the appurtenant structure.

c. Operating Records. The structural stability of the dam is not considered to be affected adversely by the operational features of the dam.

d. Post-Construction Changes. June 1953 construction drawings on file with Baltimore City show construction of an 84-inch inlet/outlet conduit through the reservoir embankment.

e. Seismic Stability. The dam is located in Seismic Zone 1; and, based on visual observation, the static stability of the dam appears to be adequate; and the structure is presumed to present no hazard from earthquakes.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Assessment. The visual observations indicate that Lake Ashburton is in satisfactory condition. With the exception of the small seepage which was noted near the toe of the Wash Water Lake embankment located east of Lake Ashburton and which could possibly be associated with the lake, there is no indication that the dam is unstable.

b. Adequacy of Information. Available information, in conjunction with visual observations, is considered to be sufficient to make the recommendations that are given below.

c. Urgency. Although there is no urgency in instituting the remedial measures recommended below, the measures should be accomplished in a timely manner.

d. Necessity for Additional Information. If the rate or turbidity of the seepage increases significantly, the owner should retain the services of a professional engineer to positively identify the source of the seepage noted at the toe of the Wash Water Lake embankment.

7.2 Recommendations/Remedial Measures

It is recommended that the following remedial measures be implemented by the Owner:

a. Fill the erosion gully which exists approximately half-way up the downstream side of the eastern embankment and plant grass in an effort to stabilize the area.

b. Fill the animal burrows noted on the eastern embankment.

c. Regularly check the operation of the sluice gate at the Ashburton Water Purification Plant and all gate valves which are involved in maintaining the water level in the lake.

d. The small seepage observed near the toe of the Wash Water Lake embankment opposite the east end of Lake Ashburton should be inspected on a regular basis. The source of the seepage cannot be positively identified, but it could possibly be from Lake Ashburton, from the Wash Water Lake, or from the 48-inch water line in the vicinity. If the seepage rate increases significantly, or if there is a change in the turbidity of the seepage, an investigation should be conducted to positively identify the source, and if warrented, the seepage should be controlled.

e. Control the brush and shrub growth on the embankment slopes.

f. Develop a formal warning system to alert downstream residents in the event of emergencies.

APPENDIX A

VISUAL INSPECTION CHECKLIST

PHASE I

APPENDIX A
VISUAL INSPECTION CHECKLIST
PHASE I

Name of Dam: Lake Ashburton County (or City): Baltimore City State: Maryland

NDI ID. No.: MD- 108 Type of Dam: Earth & RockFill Hazard Category: High

Date(s) Inspection: May 26, 1980 Weather: Clear Temperature: 70's

Pool Elevation at Time of Inspection: 352± M.S.L. Tailwater at Time of Insp. N/A M.S.L.

Inspection Personnel:

J. D. Nauman

A. Zamboky

Review Inspection Personnel:

E. J. Zeigler

J. G. Mintiens

J. D. Nauman

J. D. Nauman Recorder

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	One erosion gully noted. Two small animal burrows were noted on eastern embankment.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical alignment varies by 12 inches Horizontal alignment satisfactory	
RIPRAP FAILURES	None	

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	None	
ANY NOTICEABLE SEEPAGE	A small seepage area was noted near the southwestern toe of the adjacent wachwater lake (Peck's Branch Dam)	Source unknown. Plant personnel have been aware of seepage since 1977. Continuing observation recommended.
STAFF GAGE AND RECORDER	Staff gage used for checking water levels sensed by pressure sensor on Ashburton Pumping Station suction main.	Operator reported that staff gage and pressure sensed water level readings are compared once every two months
DRAINS	None	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	N/A	
INTAKE STRUCTURE	Not observed - Ashburton Gate House locked	
OUTLET STRUCTURE	Underground gate valves in valve vaults were not observed	
OUTLET CHANNEL	None	
EMERGENCY GATE	N/A	

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	N/A	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

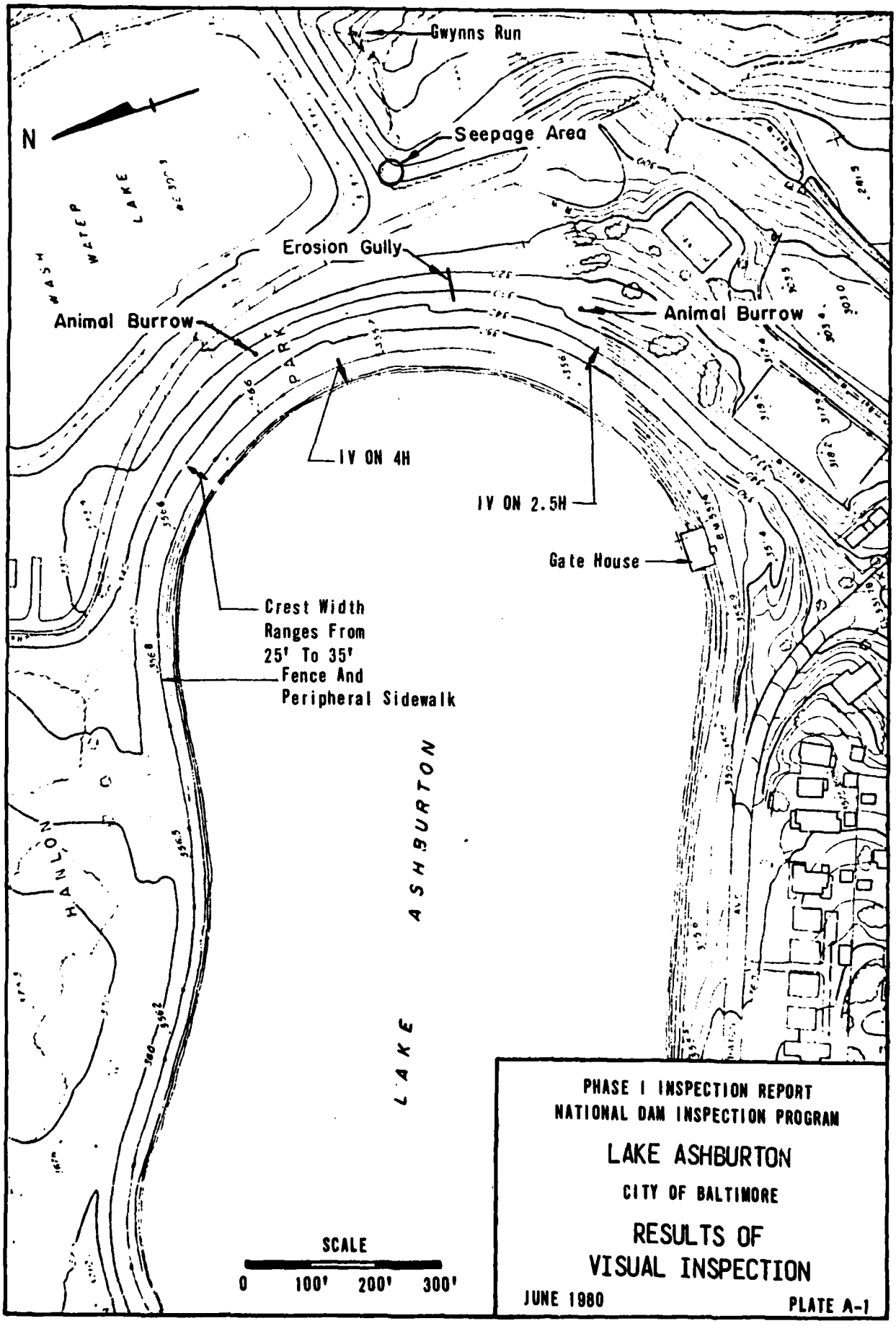
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	Baltimore City Survey Benchmark B.M. 5579 is located on the southern side of the gatehouse.	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Heavy vegetation and small riprap	
SEDIMENTATION	Some sedimentation observed on reservoir bottom but could not be quantified	Lake Ashburton is not cleaned
UPSTREAM RESERVOIRS	N/A	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	N/A	
SLOPES	N/A	
APPROXIMATE NUMBER OF HOMES AND POPULATION	If embankment failed, water would flow directly southwest into Gwynns Run. Some water conceivably could also flow into the washington lake.	


Gwynns Run
N
Seepage Area
WASH
WEEP
LAKE
Erosion Gully
Animal Burrow
Animal Burrow
PARK
1V ON 4H
1V ON 2.5H
Gate House
Crest Width
Ranges From
25' To 35'
Fence And
Peripheral Sidewalk
HANLON
LAKE ASHBURTON
SCALE
0 100' 200' 300'
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
LAKE ASHBURTON
CITY OF BALTIMORE
RESULTS OF
VISUAL INSPECTION
JUNE 1980
PLATE A-1

APPENDIX B

ENGINEERING DATA CHECKLIST

PHASE I

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Lake Ashburton

ID# NDI ID No Md. - 108

ITEM	REMARKS
AS-BUILT DRAWINGS	Some construction drawings of reservoir piping modifications and of the reservoir gate house are available.
REGIONAL VICINITY MAP	Lake Ashburton is shown on essentially all maps of Baltimore City.
CONSTRUCTION HISTORY	Reservoir constructed in 1910. No construction records are available.
TYPICAL SECTIONS OF DAM	A typical section of the embankment has been obtained from Baltimore City and is included as Plate E-2.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	All inflow and outflow from the reservoir is controlled as part of the Baltimore City water distribution system. Piping diagrams are available from Baltimore City.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	Not applicable
DESIGN REPORTS	Not available
GEOLOGY REPORTS	Geologic quadrangle mapping dated 1979 by the Maryland Geological Survey is available and included as Appendix F.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Not available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Not available

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

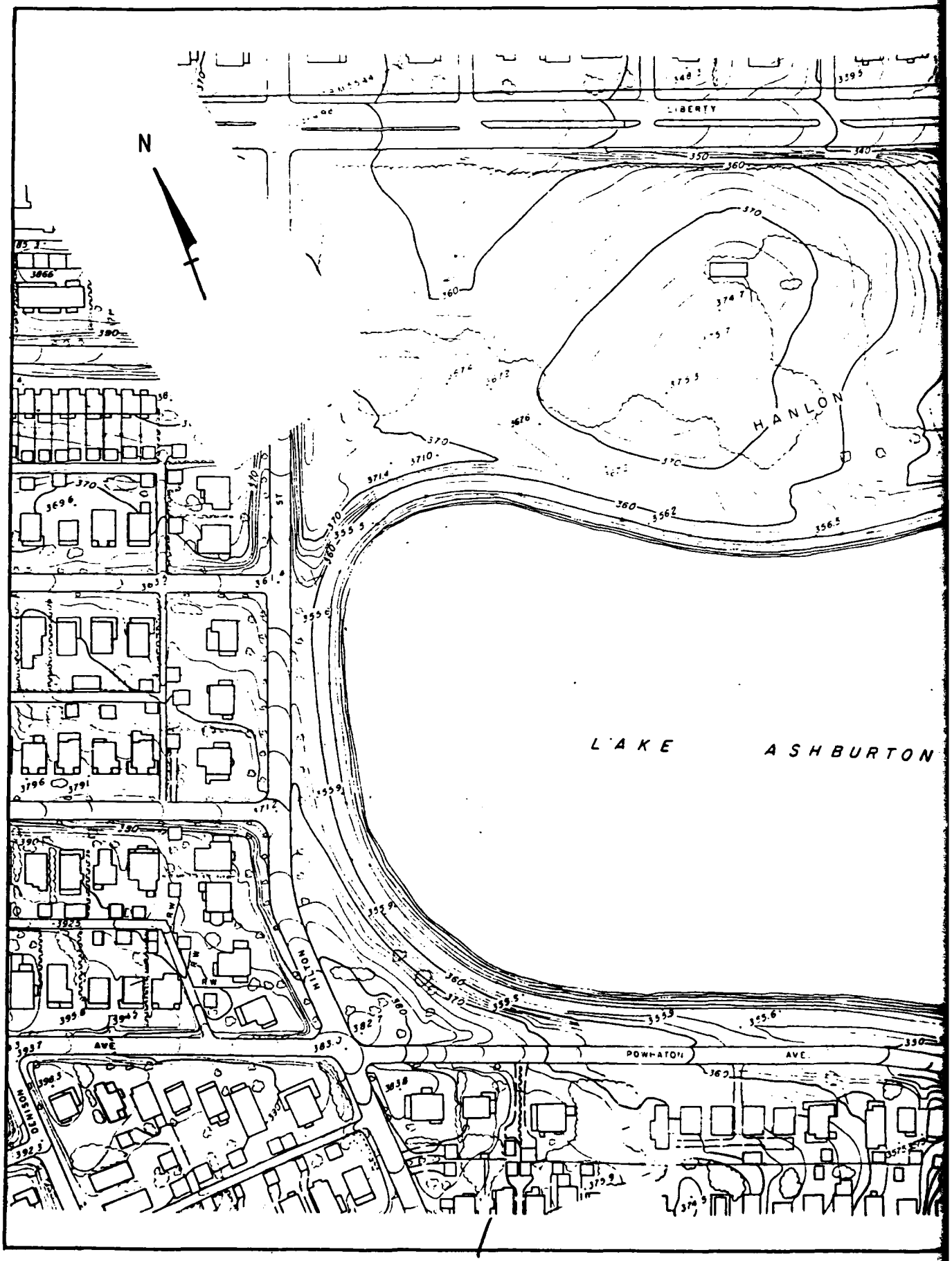
ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	Not available
BORROW SOURCES	UnKnown
MONITORING SYSTEMS	Reservoir water levels are sensed by a pressure sensor on the Ashburton Pumping Station suction main and automatically recorded continuously.
MODIFICATIONS	Some drawings on piping modifications are available.
HIGH POOL RECORDS	Available through the Baltimore City Bureau of Water and Waste Water, Pumping Section

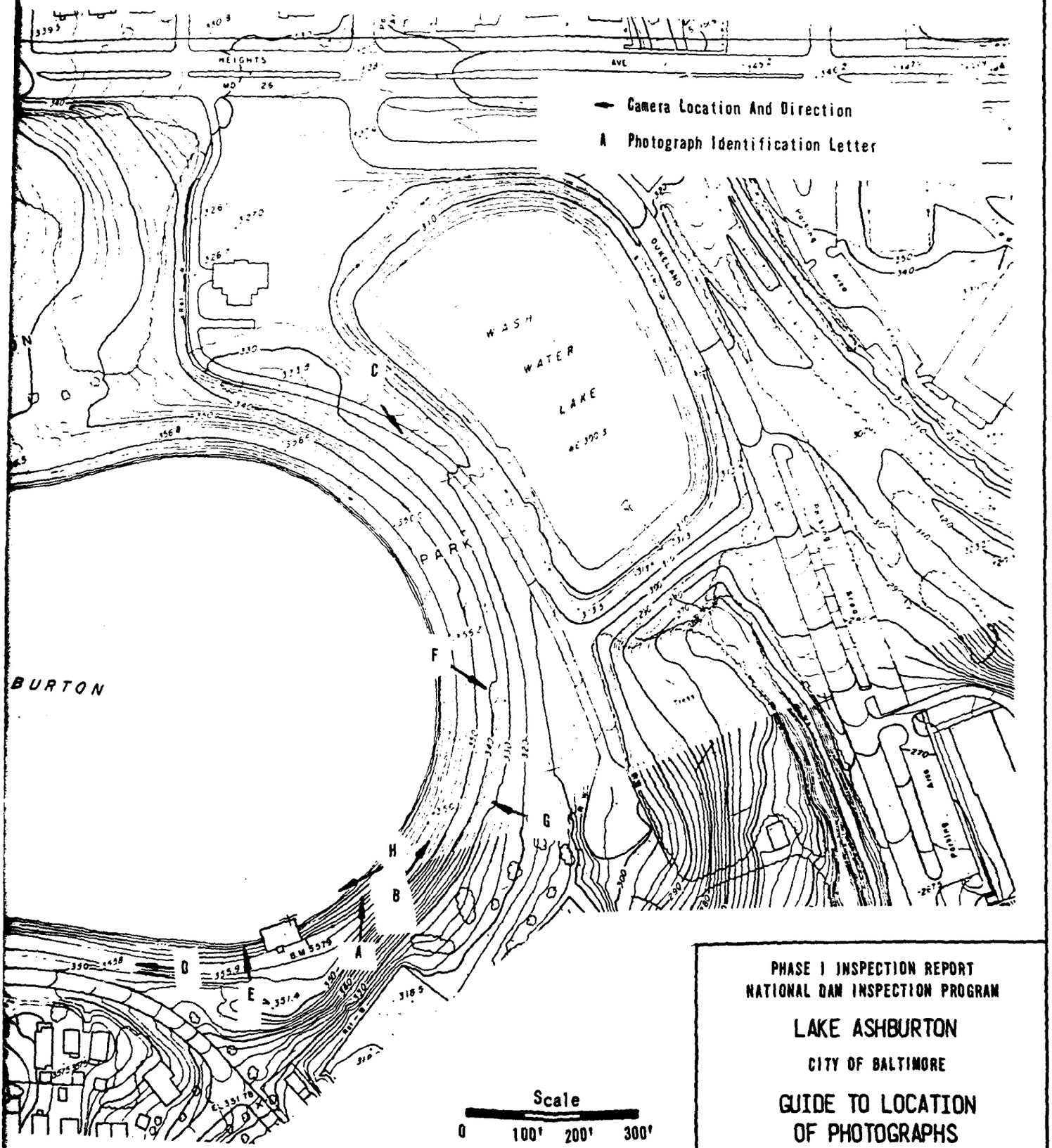
CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Unknown
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	Maintenance and operation records are maintained on mechanical and electrical equipment are available from the City of Baltimore, Bureau of Water and Waste Water.
SPILLWAY PLAN SECTIONS DETAILS	Not applicable
OPERATING EQUIPMENT PLANS AND DETAILS	Current piping diagrams for this portion of the Baltimore City water supply are available From the City of Baltimore.

APPENDIX C

PHOTOGRAPHS


N
LIBERTY
HANLON
L A K E
A S H B U R T O N
POWHATON
AVE
DENISON
HILTON



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

LAKE ASHBURTON

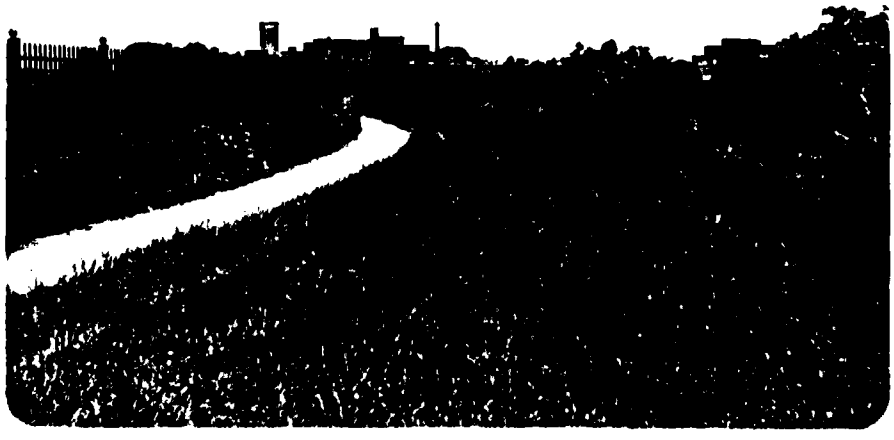
CITY OF BALTIMORE

GUIDE TO LOCATION OF PHOTOGRAPHS

JUNE 1980 PLATE C-1

LAKE ASHBURTON

A. Eastern End of Reservoir



B. Crest of Eastern Embankment

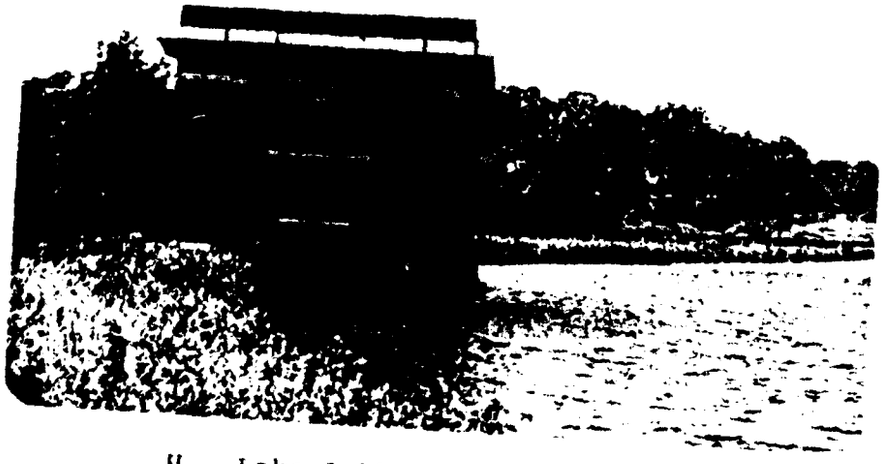
C. Downstream Slope of
Eastern Embankment

D. Downstream Slope of
Southern Embankment

E. Riprap Slope Protection

F. Erosion Gully on Eastern Embankment

G. Animal burrow on Eastern Embankment



H. Lake Ashburton Gate House

APPENDIX D

HYDROLOGY AND HYDRAULICS

EVALUATION OF AFFECTS OF
MAXIMUM PROBABLE PRECIPITATION
UPON RESERVOIR WATER SURFACE

Name of Dam: Lake Ashburton (NDI-108)

Drainage Area: (Lake Surface Area at Maximum Pool) = 0.041 sq. miles

Unadjusted Probable Maximum Precipitation (PMP) = 24.2 inches/24 hrs. for 200 square miles

Adjusted PMP for Shape Factor for 200 Square Miles = 24.2 inches/24 hrs. x .80 = 19.4 inches/24 hours[1,2]

Adjusted PMP for Drainage Area = 19.4 x 123% = 23.9 inches/24 hours[1] for 10 square miles

(Note: PMP curves from Hydrometeorological Report 33 do not extend beyond drainage of less than 10 square miles. While the lake surface area is substantially less than this value, no extension of the published curves has been attempted.)

Maximum Pool Elevation = 353 feet above m.s.l.

Pool Elevation Following Occurrence of PMP of 24 hour Duration = 353 + 2.0 feet = 355 feet above m.s.l.

(Note: Overflow structure at Ashburton Gate House may no longer function. Pool elevation derived above conservatively assumes that overflow structure is not functioning during occurrence of PMP.)

Top of Dam Elevation = 355.9 feet above m.s.l. (low point)

Remaining Freeboard = 355.9 - 355
= 0.9 feet

Conclusion: Dam would not be overtopped following storm having an intensity equal to PMP derived above.

[1] Hydrometeorological Report 33, U.S. Army, Corps of Engineers, 1956.
[2] Engineering Circular 1110-2-27, U. S. Army, Corps of Engineers, August, 1966.

Tabulation of Reservoir Storage Capacity Vs. Pool Elevation[1]

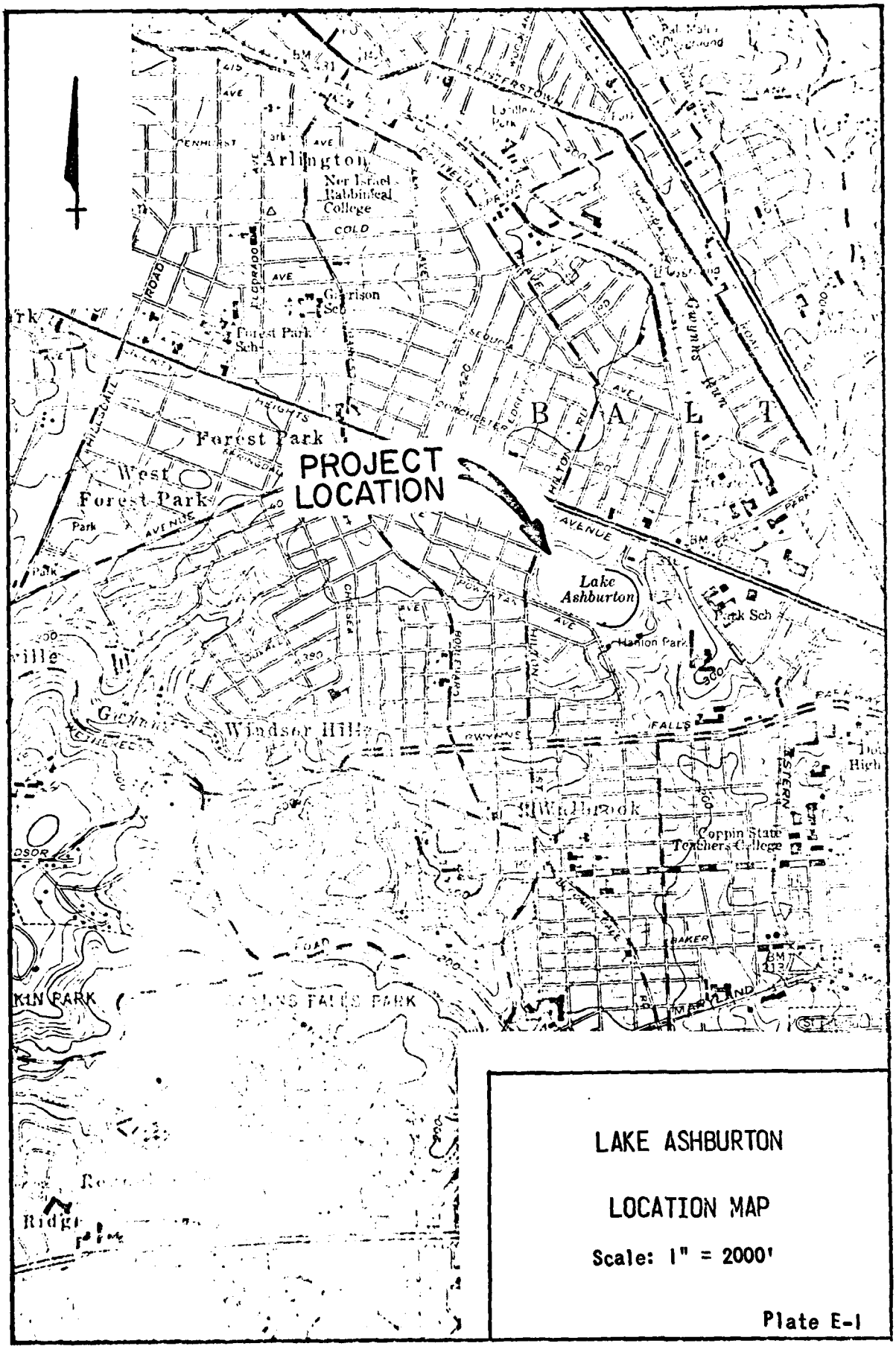
Name of Dam: Lake Ashburton (NDI-108)

Pool Elevation feet above m.s.l.[2]	Surface Area acres	Reservoir Storage acre-feet
320 (Reservoir Bottom)	-	0
325		85
330		170
335		265
340		370
345		480
350		600
353 (Maximum Pool)	26[3]	675
355.9 (Top of Dam)	27[3]	750[4]

[1] Source: Lake Ashburton Capacity Curve, City of Baltimore, Department of Public Works, Bureau of Water Supply, June 26, 1928.
[2] Baltimore Topographical Survey Datum
[3] Area planimetered from a reduction of Baltimore City 100-scale photogrammetric mapping.
[4] Computed by Rummel, Klepper & Kahl

APPENDIX E

PLATES

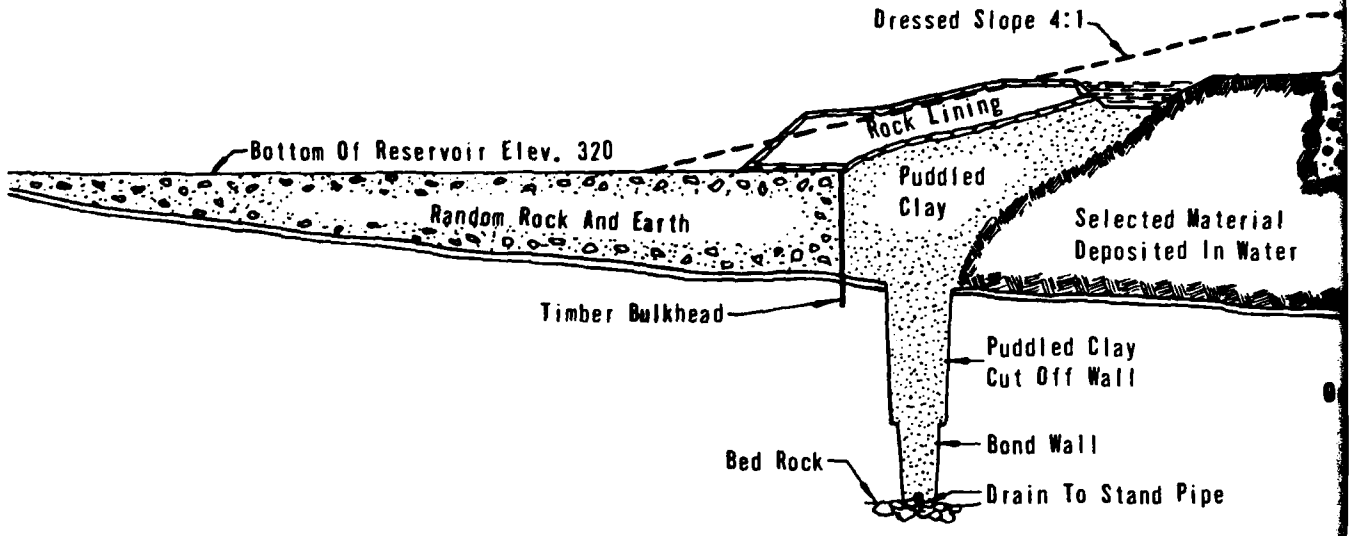


LAKE ASHBURTON

LOCATION MAP

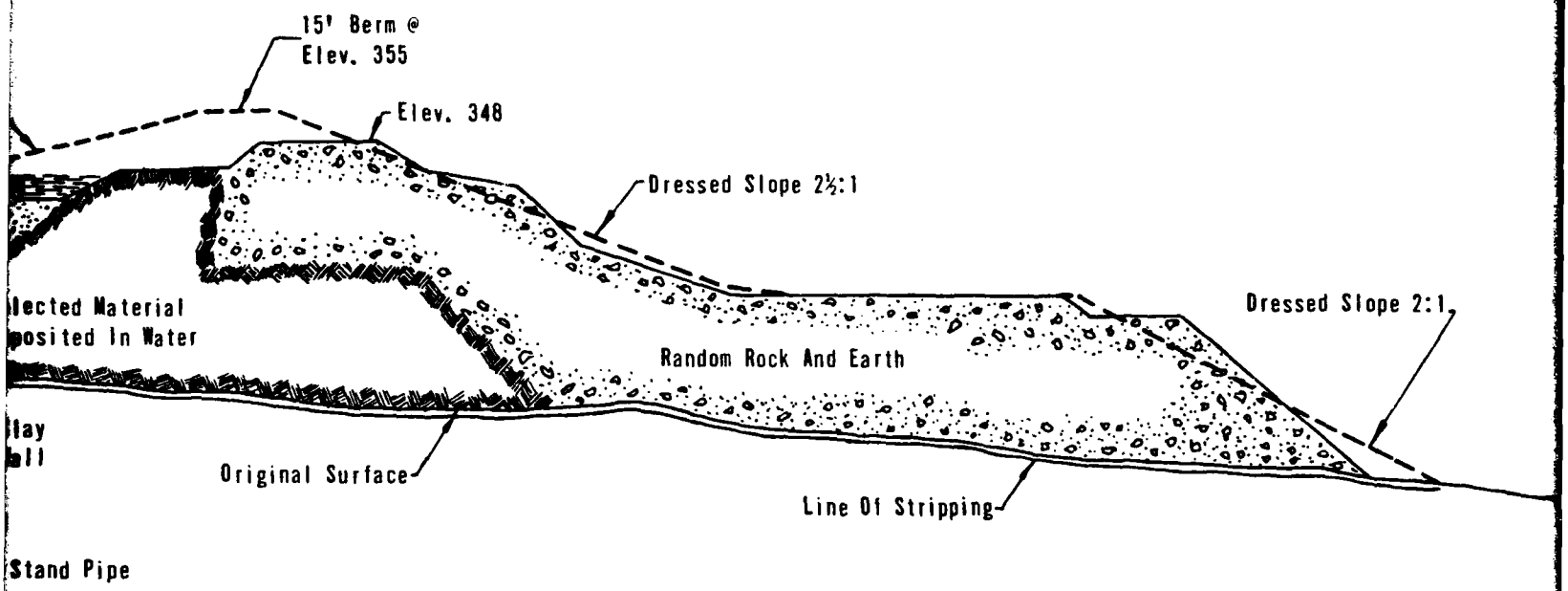
Scale: 1" = 2000'

Plate E-1



SKETCH SHOWING METHOD O

Scale 1" =



METHOD OF CONSTRUCTION ON DAM

Scale 1" = 40'

TYPICAL SECTION

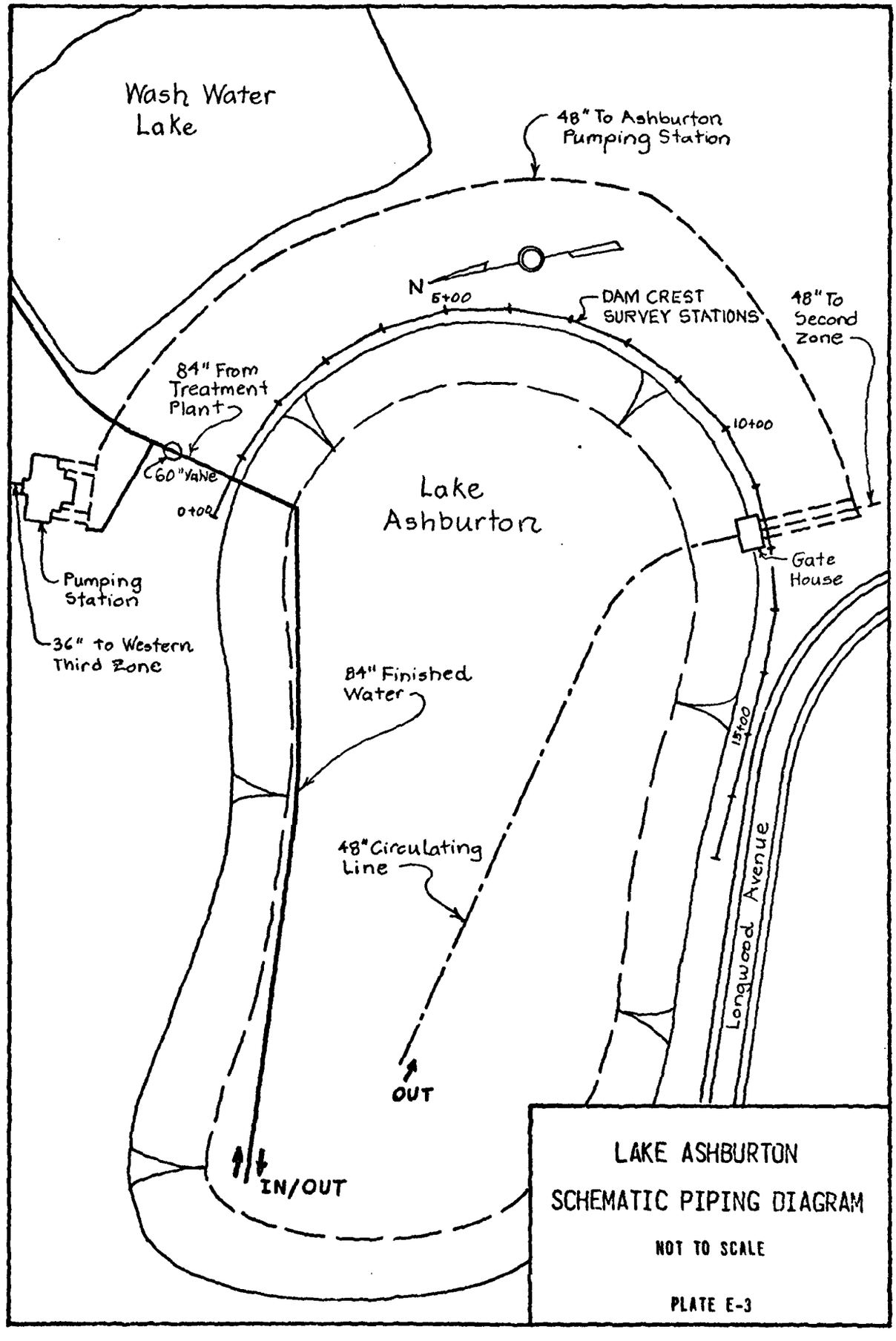
LAKE ASHBURTON

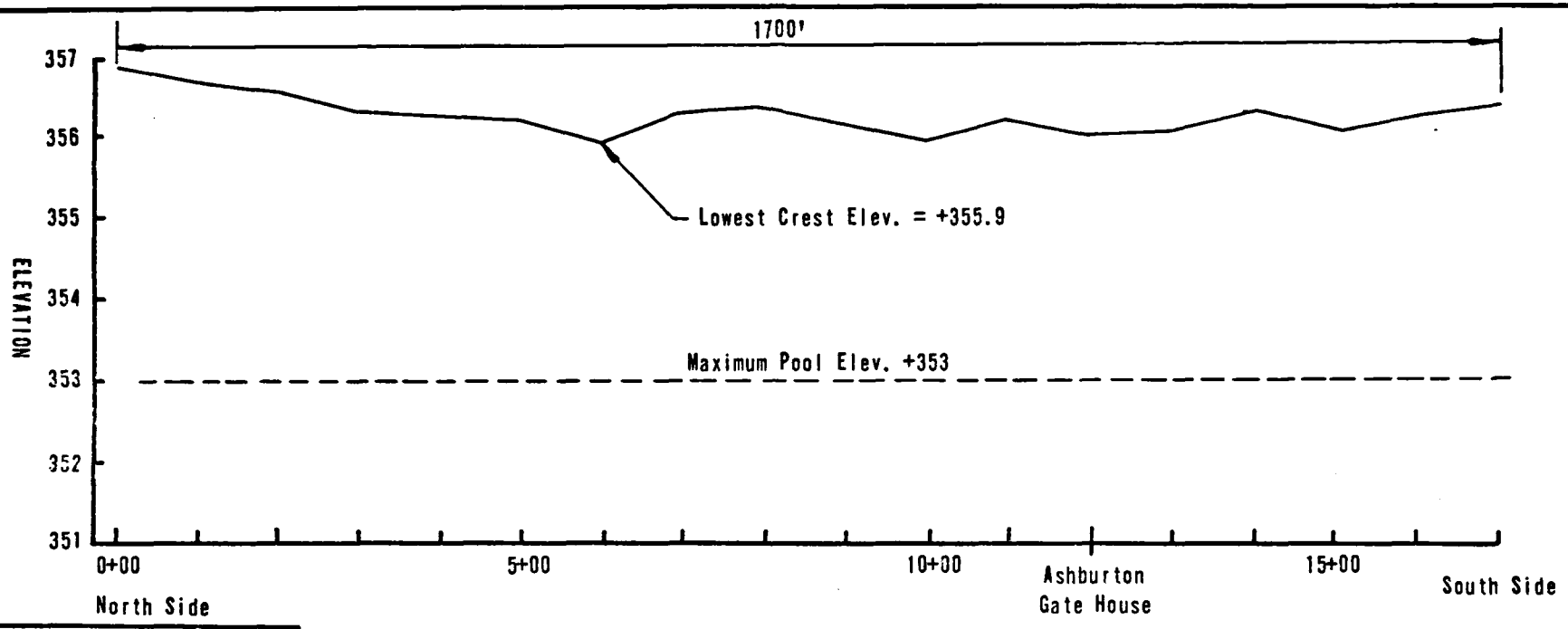
TRACED FROM PRINT
DATED DEC. 1, 1909
BALTO. CITY FILE NO. 112-B-2

PLAT

1

2


Wash Water Lake
48" To Ashburton Pumping Station
N
5+00
DAM CREST SURVEY STATIONS
48" To Second Zone
84" From Treatment Plant
10+00
60" VANE
0+00
Lake Ashburton
Gate House
Pumping Station
36" to Western Third Zone
84" Finished Water
15+00
Longwood Avenue
48" Circulating Line
OUT
IN/OUT
LAKE ASHBURTON
SCHEMATIC PIPING DIAGRAM
NOT TO SCALE
PLATE E-3



DAM CREST PROFILE

(LOOKING DOWNSTREAM)

Note: Dam Crest Survey Stations
Are Shown On Plate E-3

Datum Elevation Is Interpolated From 100 Scale Photogrammetry Obtained From The City Of Baltimore

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGAM

LAKE ASHBURTON

CITY OF BALTIMORE

DAM CREST SURVEY

JUNE 1980

PLATE E-4

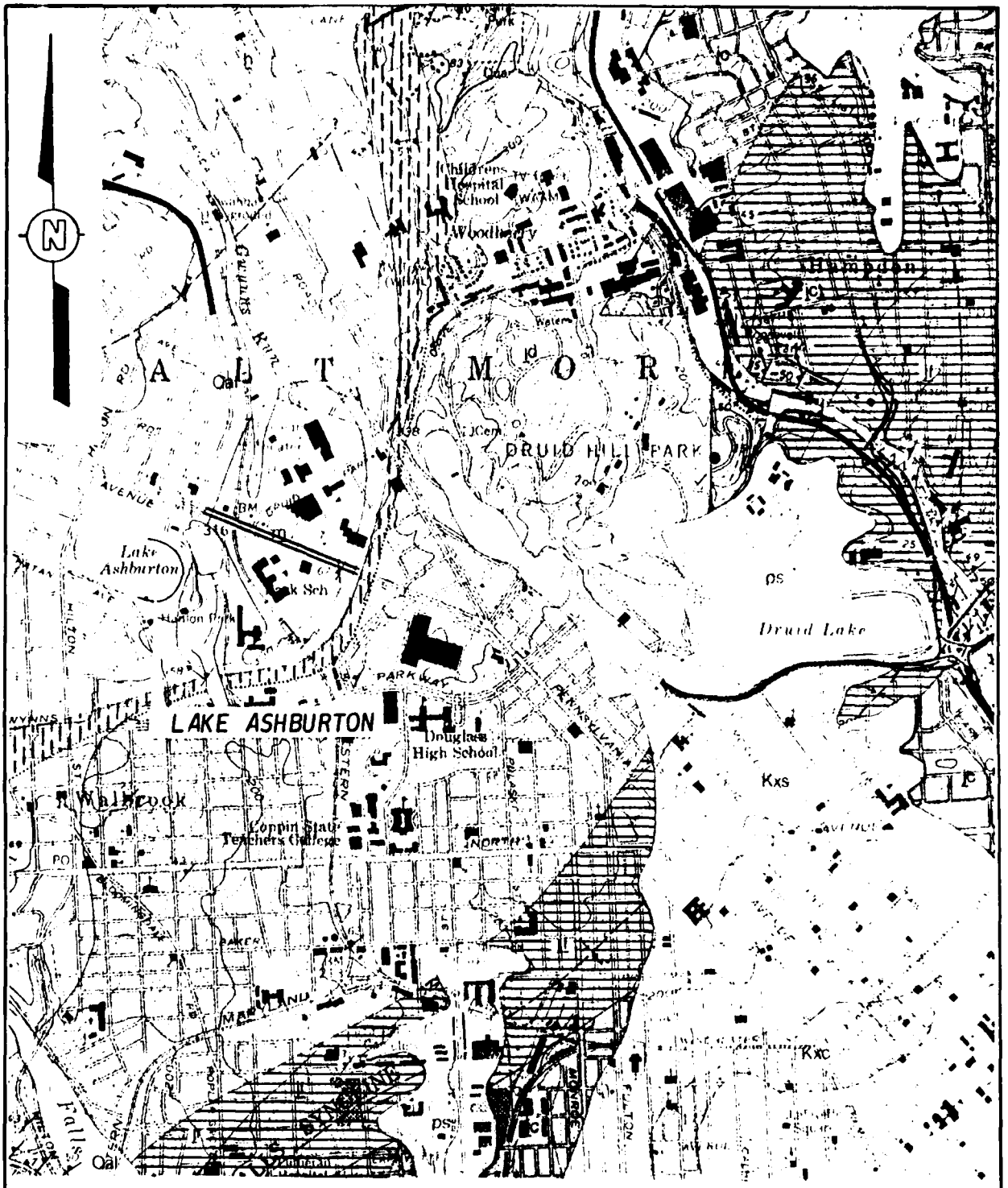
APPENDIX F

GEOLOGY

LAKE ASHBURTON

GEOLOGY

Lake Ashburton is located in the Eastern Division of the Piedmont Physiographic Province. The Piedmont Province is characteristically underlain by a complex series of metamorphosed sedimentary and igneous rocks. Lake Ashburton is underlain by the Hollofield Layered Ultramafite, a member of the Cambrian age Baltimore Mafic Complex. The impoundment is located on the southern limb of the Hollofield Anticline.



SCALE

1000' 0 1000' 2000' 3000' 4000'

REFERENCE:

GEOLOGIC MAP OF THE BALTIMORE WEST QUADRANGEL, PREPARED BY STATE OF MARYLAND, MARYLAND GEOLOGICAL SURVEY, DATED 1979, SCALE 1" = 2000'

LAKE ASHBURTON

GEOLOGY MAP

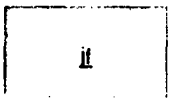
RUMMEL, KLEPPER & KAHL

LEGEND

af

Artificial Fill

Consists of heterogeneous materials such as rock, unconsolidated sediment, slag, refuse, and dredge spoil. Only major areas of filled or highly disturbed ground have been mapped. Thickness 3 to 5 m (≈10 to 15 ft).

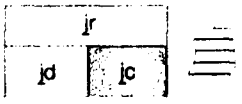


Jones Falls Schist

Medium- to coarse-grained biotite plagioclase muscovite-quartz schist, in places accompanied by fine grained biotite plagioclase quartz gneiss in layers a few centimeters thick. Garnet, and less commonly tourmaline occur in some outcrops. Includes very minor muscovite-plagioclase quartz schist, quartzite, amphibolite, and muscovite-quartz-feldspar gneiss.

Mount Washington Amphibolite

Fine- and medium-grained, generally massive amphibolite locally with pyroxene, and rarely with chlorite-rich zones several meters thick. Includes less than 10% actinofels and actinoschist as layers 2 centimeters or less thick, but in a few places several tens of meters thick. Serpentinite rare. Amphibolite typically uniform but locally exhibits layering on a scale of centimeters to tens of centimeters defined by variations in the amphibole/plagioclase ratio. Amphibolite locally includes irregular patches of lighter colored, coarser grained amphibolite (net veins). North of U.S. Rte. 40, generally but not invariably massive; south of U.S. Rte. 40, well foliated and not commonly massive. Where massive commonly crops out as cobbles and boulders in a clay-rich, red saprolite.



James Run Formation

jr *Relay Gneiss Member. Fine- to medium-grained biotite-quartz plagioclase gneiss, locally containing muscovite. Mica absent and magnetite present in some outcrops. Commonly cut by numerous randomly oriented joints.*

jc *Carroll Gneiss Member. Fine- to medium-grained biotite-quartz plagioclase gneiss, locally with muscovite. Mica absent and magnetite present in some outcrops. Includes subordinate, concordant amphibolite in layers a few centimeters to tens of centimeters thick, but locally several meters thick. Facies equivalent of Druid Hill Amphibolite Member.*

jd *Druid Hill Amphibolite Member. Fine- to medium-grained, generally well foliated amphibolite, locally with irregular anastomosing patches of coarser grained, lighter colored amphibolite. Chlorite fels and actinofels, locally foliated, associated with the amphibolite in places. Includes subordinate quartzo-feldspathic gneiss and granofels to the south which increase northward to nearly half the volume of the unit. Scale of layering ranges from a few tens of centimeters to more than 10 meters. Felsic rocks are generally fine-grained and well foliated, but may also be coarser grained, massive, and intricately jointed.*

Overprint: Pegmatite injection complex. Areas in which the mapped rock formations include up to 50% pegmatite, identical to that described above, commonly as concordant masses a few meters thick. In places associated with a finer grained, granitic or gneissic rock with the same mineralogy.

REFERENCE:

GEOLOGIC MAP OF THE BALTIMORE WEST QUADRANGLE, PREPARED BY STATE OF MARYLAND, MARYLAND GEOLOGICAL SURVEY, DATED 1979

h

Hollofield Layered Ultramafite

Ultramafic and mafic rocks interlayered on a scale varying from centimeters to tens of meters. Chiefly actinofels and actinoschist with subordinate amphibolite and very subordinate serpentinite.

Qal

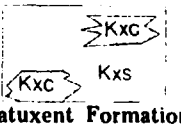
Alluvium

Interbedded gravel, sand, silt, and clay of varied composition and sorting. Typically confined to flood plains of perennial streams and upland gathering areas. Sediment size, sorting, and mineralogy are strongly controlled by the source rocks and geomorphic setting. The quartzose sand and polymict gravel are typically well bedded and loosely consolidated, the silt and clay are often water saturated and poorly bedded. Minor amounts of colluvium (unmapped) may interfinger with alluvium at or near the bases of slopes. Structural symbols on alluvium represent bedrock exposures in stream valleys. These are typically either along the margins of the flood plain or close to the main channel of the drainage. Thickness 0.5 to 5 m (≈2 to 15 ft).

Cold Spring Gneiss

Uniform, fine- to medium-grained biotite-muscovite-microcline quartz plagioclase gneiss or schistose gneiss, locally devoid of muscovite. Commonly with small feldspar augen several millimeters in length and locally up to one centimeter. Age unknown.

Overprint: Cold Spring Gneiss injection complex. Areas in which the mapped rock formations include 50% or more Cold Spring Gneiss in sills up to tens of meters thick.



Patuxent Formation

Kxs *Sand facies. Highly variable, interbedded sand, gravel, silt, and clay locally indurated by ferruginous cement. Sand and gravel typically quartzose with a buff, kaolinitic clay silt matrix. Sediments are organized into fining upward packages 3 to 5 m (≈10 to 15 ft) thick consisting of planar bedded gravel with clay clasts or cross bedded sand at the base grading upward to laminated or massive silt clay at the top. Exposures vertically sequences show abrupt sediment size changes and erosive contacts. The heavy mineral suite is characterized by staurolite, zircon, tourmaline and kyanite. Sparse silicified and abundant iron oxide replacements of both excadinds and conifers as wood are present throughout the formation. These sediments were deposited in high gradient, braided to meandering streams.*

Kxc *Clay facies. Light gray to black or brown clay containing variable amounts of quartz silt and gravel; local concentrations of lignitic, partially pyritized wood or macerated leaf and cone debris are associated with some siderite concretions. Thin planar beds of sand and/or gravelly clay are interbedded with massive clay. These isolated clay pods are thought to be accumulations on deflated surfaces such as abandoned stream channels or in pre Cretaceous topographic lows.*

Thickness 2 to 35 m (≈7 to 115 ft).

GEOLOGY MAP LEGEND

RUMMEL, KLEPPER & KAHL

LEGEND

ps ps

Potomac Group (?)

ps *Sand-gravel lithofacies. Poorly sorted to well sorted quartz sand containing variable amounts of vein quartz and quartzite gravel. Framework components are commonly coated with ferric oxide and are locally limonite-cemented. Varied amounts of silt and clay are present in lenses and pods and as matrix. Sand, where exposed below the soil zone, is typically planar to cross-bedded. Pebbles commonly range from 1 to 10 cm in diameter and are concentrated in coarse planar beds or are disseminated in finer sediments.*

REFERENCE:

GEOLOGIC MAP OF THE BALTIMORE WEST QUADRANGLE, PREPARED BY STATE OF MARYLAND, MARYLAND GEOLOGICAL SURVEY, DATED 1979

GEOLOGY MAP LEGEND

RUMMEL, KLEPPER & KAHL